Electronics and Electrical Communications Department

Tanta University   **Faculty of Engineering**

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Sheet #3
Amplitude Modulation (DSBTC)

1) An audio signal $15\cos(2\pi.1500.t)$, amplitude modulates a carrier $60\cos(2\pi.10^6 t)$
   a) Write the AM equation
   b) Sketch the AM wave.
   c) Determine the modulation factor (μ) and the percentage modulation.
   d) Sketch the spectrum of the AM wave.
   e) What frequencies would show up in the spectrum?

2) The total power content of AM signal is 1000 W. Determine the power being transmitted at the :
   a) Carrier Frequency
   b) Each of the sidebands
      When the percent modulation is 100%.

3) Repeat problem 2 for percent modulation 80%.

4) The power content of the carrier is 5 KW. Find :
   a) P_{total}
   b) $P_{L.S.B}$, $P_{U.S.B}$,   for 75% modulation.
   c) Comment on your results.

5) Determine the percent modulation of n amplitude modulated wave which has power content at the carrier of 8 KW and 2 KW in each of its sidebands.

6) For an AM wave where $m(t) = 5.\cos(2\pi.500.t)$ and the carrier power is 32 Watt and the modulation sensitivity equal 0.125
   a) Sketch the AM wave.
   b) Write the AM equation.
   c) Find P_{total}, η , Comment.
   d) Find the B.W. of m(t) and B.W. of AM wave.